Information Disclosure Statement

In the Office action, the Examiner stated, "The information disclosure statement filed 02/19/2003 has been considered."

It is requested that an initialed form 1449 be provided confirming this.

Specification

In the Office action, the Examiner stated, "It is noted that this application appears to refer subject matter disclosed in prior copending applications No. 09/052,895 and 09/052,915, filed Mar. 31, 1998. The current status of all nonprovisional parent applications referenced should be included."

Applicants have amended the specification to recite the current status of applications incorporated by reference. These are the only changes to the specification.

Remarks

Claims 15-57 are pending in the application. Claims 15, 35, 47, and 51 are independent. No claims have been allowed.

Applied Art

Claims 15-57 stand rejected under 35 U.S.C. 102(e) over U.S. Patent No. 6,414,498 to Chen ("Chen") entitled, "System, IC Chip, On-Chip Test Structure, and Corresponding Method for Modeling One or More Target Interconnect Capacitances." Applicants respectfully submit the claims in their present form are allowable over the cited art and traverse all rejections. For a 102(e) rejection to be proper, the cited art must show each and every element as set forth in a claim. (*See* MPEP § 2131.01.)

Rejection of Claims 15-57 under 35 U.S.C. § 102(e)

Claim 15

Claim 15 is directed toward a method for measuring cross-coupling capacitance. The method comprises: "charging a first wire..." and "performing a *first measurement associated with a capacitance of the first wire.*" The claim also requires "charging the second wire..." and "performing a *second measurement associated with a capacitance of the first wire.*" (emphasis added). Therefore, claim 15 recites a method wherein *at least two measurements associated with the capacitance of a first wire are made.*

Chen is understood to disclose only taking a *single measurement* of current in order to compute capacitance. In the "measuring stage" of Chen (col. 6, lines 24-44), the test wire 105 is charged and ammeter 138 begins to take a measure of the current I_{charg1} from the target wire 106-n to ground through transistor 112. During the "disabling phase", the measurement of the current I_{charg1} continues while charging of the test wire 105 is discontinued to ensure all charge on the target wire 106-n has been measured (column 6, lines 44-56). The average current over the time period of the measurement yields the cross-coupling capacitance c_n between the test 105 and target 106-n wires according to equation (2) of Chen. Thus, only one measurement is made in Chen.

The Office action at page 8 states:

> The measurement method according to Chen includes steps of taking a first measurement associated with a first wire (Fig. 3, col. 5, lines 35-42, for example), taking a second measurement associated with the first wire due to charge induced on the target

interconnect (col. 6, lines 22-43, and measurement of charge difference or relative charge between the target interconnect and the test interconnect and the test interconnect during charging and discharging currents to measure the cross coupling capacitance of the target interconnect net (Fig. 3, col. 6, line 22 to col. 7, line 33, for example).

This statement is respectfully traversed. As set forth in columns 5 and 6, Chen takes but *a single measurement* of current to compute capacitance. Chen at col. 5, lines 35-42 simply refers to "a measurement of any target interconnect capacitance..." The capacitance is not directly measured. The capacitance is computed based on equation (2). Col. 6, line 22 - col. 7, line 33 of Chen never suggests taking more than one measurement to compute capacitance. The only measurement taken is a single measurement, the measurement of current I_{charg1}. Col. 6, line 22 to col. 7, line 33 simply explains how one would use a single measurement of current to compute capacitance and does not involve a second measurement.

Applicants respectfully refer the examiner to other sections of the detailed description of Chen for support. For instance, Applicants refer the examiner to the summary of Chen where only a single measurement is recited. See for example, col. 2, lines 60-64, "*A measurement of the target interconnect charging current* can be made with a current meter of the system. From this measurement, a measurement of the corresponding target interconnect capacitance *may be computed.*")

Therefore, Chen could not possibly anticipate claim 15, which recites taking more than one measurement relating to a wire in order to calculate capacitance. Since the applied reference fails to describe at least one element recited in claim 15, claim 15 is not subject to a 102(e) rejection and is therefore in condition for allowance.

Claims 16-34, which depend directly or indirectly from claim 15, should also be allowable for at least the same reasons. In addition, these claims each set forth independently patentable subject matter.

For example, claim 19 recites, "The method of claim 15, further including discharging the first wire prior to recharging the first wire." Chen does not anticipate claim 19 because the method disclosed in Chen does not include recharging any wire in order to compute one capacitance. Chen describes five stages. A reset stage between 0-300ns where "only discharging is to occur." *See* col. 5, lines 48 - col. 6, line 5. An off stage between 300-400ns where all transistors are off and therefore no charging or discharging occurs. *See* col. 6, lines 6-14. An enable phase between 400-500ns where the target interconnect 106-n is charged. *See* col. 6, lines 15-23. A measure phase between

500-800ns where the test interconnect 105 is charged. *See* col. 6, lines 24-44. And a disabling phase between 800-900ns where charging of the test interconnect 105 is discontinued. *See* col. 6, lines 45-56. Lastly, another off phase between 900-1000ns where both wires are all transistors are off and therefore no charging or discharging occurs. *See* col. 6, lines 57-62. At no point in the method disclosed by Chen is any wire recharged during the computation of a single capacitance measurement. Therefore, Chen does not anticipate claim 19, which recites "recharging the first wire."

Therefore, claims 16-34 should also be allowed.

Claim 35

Claim 35 is directed toward a circuit for measuring cross-coupling capacitance and recites in part, "wherein the cross-coupling capacitance is measured between the first and second wires by *subtracting two capacitance-related measurements associated with the first wire*, one of the measurements being performed with the second wire at a first voltage level and the other of the measurements being performed with the second wire charged to a second voltage level."

Chen fails to show making two capacitance-related measurements associated with the first wire, because the method in Chen only takes a single measurement. Furthermore, claim 35 recites performing one of the measurements with the second wire at a first voltage level and the other of the measurements with the second wire charged to a second voltage level. Where does Chen disclose performing two measurements on a first wire with a second wire at respective different voltage levels during the two measurements? Chen is not understood to disclose this. Since the applied reference fails to describe at least one element recited in claim 35, claim 35 is not subject to a 102(e) rejection and is therefore in condition for allowance.

Claims 36-46, which depend directly or indirectly from claim 35, should also be allowable for at least the same reasons. In addition, these claims each set forth independently patentable subject matter.

For example, claim 36 recites, "The method of claim 35, wherein the first voltage level is ground and the second voltage level is a logic high." Chen does not anticipate claim 36 because the method disclosed in Chen includes only one measurement being performed, and therefore couldn't possibly anticipate a claim wherein one measurement is performed with the second wire at a first voltage level, the first voltage level being ground, and another measurement being performed with

the second wire at a second voltage level, the second voltage level being a logic high. Furthermore, Chen never discloses taking any measurement while any wire is held to ground. Therefore, Chen does not anticipate claim 36.

Therefore, claims 36-46 should also be allowed.

Claim 47

Claim 47 is directed toward a circuit for calculating cross-coupling capacitance and recites in part, "means for calculating cross-coupling capacitance by measuring charge needed to charge the first wire to a predetermined voltage with the second wire grounded and measuring charge needed to charge the first wire to the predetermined voltage with the second wire charged to the predetermined voltage and taking a difference between the two measurements."

Thus, claim 47 recites making more than one measurement of charge to calculate capacitance. One measurement is of the charge needed to charge the first wire to a predetermined voltage while the second wire is grounded, and the other measurement is of the charge needed to charge the first wire to the predetermined voltage with the second wire charged to the predetermined voltage. Chen could not possibly anticipate this feature because Chen only discloses making a single measurement in order to calculate capacitance.

Additionally, claim 47 recites measuring charge needed to charge the first wire to a predetermined voltage with the second wire grounded. Chen does not disclose performing a measurement while either wire is grounded. Since the applied reference fails to describe at least one element recited in claim 47, claim 47 is not subject to a 102(e) rejection and is therefore in condition for allowance.

Claims 48-50, which depend directly or indirectly from claim 35, should also be allowable for at least the same reasons. In addition, these claims each set forth independently patentable subject matter. Therefore, claims 48-50 should also be allowed.

Claim 51

Claim 51 is directed toward a method for determining cross-coupling capacitance and recites in part, "measuring a first charge that is deposited on the first wire over the period of time, the first charge being measured each time the second wire is grounded," and "measuring a second charge that

is deposited on the first wire over the period of time, the second charge being measured each time the second wire is charged to the supply voltage."

Claim 51 therefore recites taking more than one measurement in order to determine a capacitance. Chen could not anticipate such a claim because Chen only performs a single measurement in order to compute capacitance.

Additionally, claim 51 recites measuring a first charge that is deposited on the first wire over the period of time, the first charge being measured each time the second wire is grounded. Chen does not disclose performing a measurement while either wire is grounded. Since the applied reference fails to describe at least one element recited in claim 51, claim 51 is not subject to a 102(e) rejection and is therefore in condition for allowance.

Claims 52-57, which depend directly or indirectly from claim 51, should also be allowable for at least the same reasons. In addition, these claims each set forth independently patentable subject matter. Therefore, claims 52-57 should also be allowed.

Conclusion

The claims in their present form are allowable over the cited art. Such action is respectfully requested.

Respectfully submitted,

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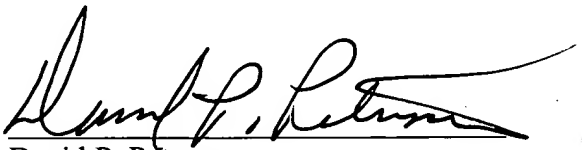
By 
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